ESH Coordinator's Meeting
Safety Topic

Chemical Storage in Laboratories

R. Selvey, SHSD IH Group
May 24, 2006

Management System: Worker Safety and Health

Subject Area: Chemicals, Working With

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Effective Date: **May 15, 2004**	Subject Matter Expert: Robert Selvey	Management System Steward: James Tarpinian

Introduction

This subject area provides requirements and guidance for all users of chemicals at Brookhaven National Laboratory (BNL). Compliance with these requirements ensures that BNL workers and guests are provided safe workplaces and healthy environments.

This subject area also serves as an essential component of the BNL work planning and control requirements for work involving chemicals. These chemical safety requirements address training, selection, use and handling, storing, transporting (on-site and off-site), and disposal in a manner that meets Laboratory expectations.

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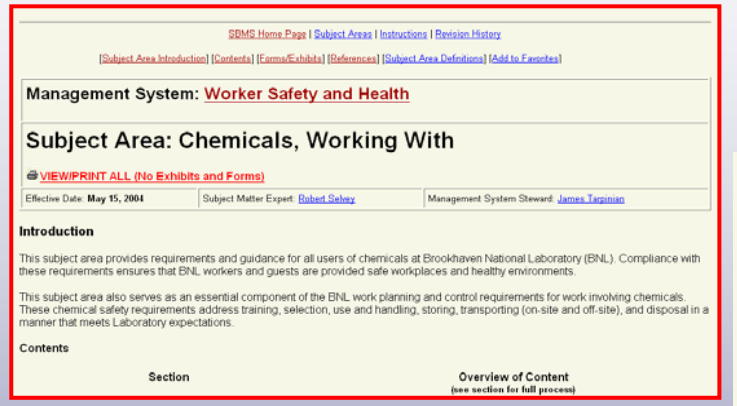
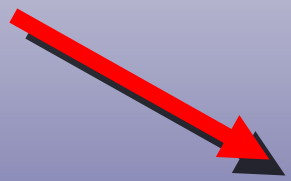
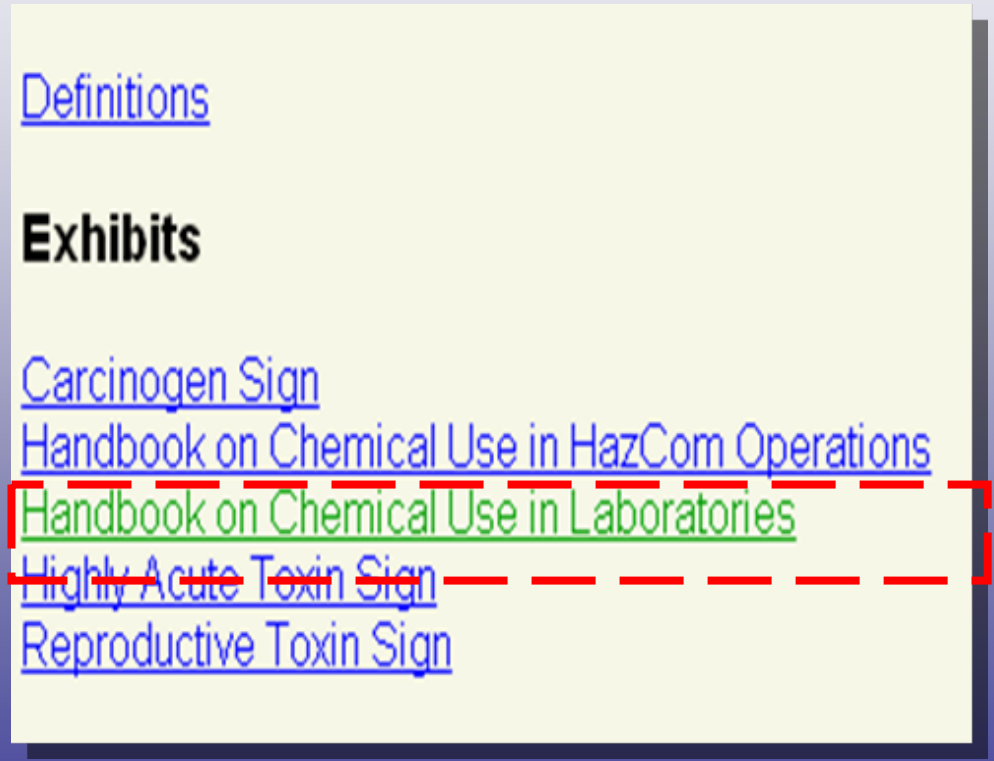
Section	Overview of Content (see section for full process)

Chemical Storage in Laboratories







Brookhaven National Laboratory

Handbook on Chemical Use in Laboratories

(OSHA Laboratory Standard)

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Chemical Storage in laboratories

1.	**Flammable and combustibles** (See ES&H Standard 4.10.2, Flammable Liquids: Storage, Use, and Disposal) • Minimize the quantities to an amount adequate for day-to-day operations. • Store large quantities in a NFPA approved flammable storage cabinet. • Store away from oxidizers. • Do not be store in ordinary refrigerators. A spark from the motor or light switch can ignite such a substance. • Use only in well ventilated area. • Remove all heat and ignition sources from the area. • Keep containers closed when not in use. • Check containers regularly for leaks. Ground large containers before transferring liquids from metal containers. 
2.	Storage of any material (other than water) in aboveground or underground tanks or portable containers >/= 260 gallons are covered by the requirements found in the Storage and Transfer of Hazardous Materials Subject Area. 
3.	Do not store hazardous chemicals over sinks where breakage could cause entry into the sanitary system.
4.	Segregate chemicals in storage to prevent incompatibility in flammability and reactivity in the event of accidental breakage. See Examples of Incompatible Chemicals in the Hazardous Waste Management Subject Area, and exhibits on List of Explosive Materials and Materials Likely to Form Peroxides in Storage.
5.	Store chemicals known to be highly toxic, including those classified as carcinogens, in ventilated storage areas in unbreakable chemically resistant secondary containers. Post the storage areas for these chemicals with a warning signs and have limited access. 
6.	Do not store acids and caustic liquids above eye level. A typical storage location for these types of corrosive liquids is a base cabinet under a sink or a special acid storage cabinet. 
7.	Avoid exposing chemicals to heat or sunlight.

1.	**Flammable and combustibles** (See ES&H Standard 4.10.2, Flammable Liquids: Storage, Use, and Disposal) ▪ Minimize the quantities to an amount adequate for day-to-day operations. ▪ Store large quantities in a NFPA approved flammable storage cabinet. ▪ Store away from oxidizers. ▪ Do not be store in ordinary refrigerators. A spark from the motor or light switch can ignite such a substance. ▪ Use only in well ventilated area. ▪ Remove all heat and ignition sources from the area. ▪ Keep containers closed when not in use. ▪ Check containers regularly for leaks. ▪ Ground large containers before transferring liquids from metal containers.
2.	Storage of any material (other than water) in aboveground or underground **tanks or portable containers >/= 250 gallons** are covered by the requirements found in the Storage and Transfer of Hazardous Materials Subject Area.

3.	Do not store hazardous chemicals over sinks where breakage could cause entry into the sanitary system.
4.	Segregate chemicals in storage to prevent incompatibility in flammability and reactivity in the event of accidental breakage. See Examples of Incompatible Chemicals in the Hazardous Waste Management Subject Area, and exhibits on List of Explosive Materials and Materials Likely to Form Peroxides in Storage.
5.	Store chemicals known to be highly toxic, including those classified as carcinogens, in ventilated storage areas in unbreakable chemically resistant secondary containers. Post the storage areas for these chemicals with a warning signs and have limited access.

6.	Do not store acids and caustic liquids above eye level. A typical storage location for these types of corrosive liquids is a base cabinet under a sink or a special acid storage cabinet.
7.	Avoid exposing chemicals to heat or sunlight.
8.	Store chemicals in cabinets or shelves when not in use. Toe boards (0.5 inch high lips on the front of the shelf) on shelves lessen the chance of accidentally dislodging bottles from the shelf. (Cabinets with metal shelves can often be converted into shelves with toe boards [lips] by turning the shelves over to place the metal structural support upwards).

9.	Do not place food in laboratory refrigerators. Laboratory refrigerators are to be used for storage of chemicals only. Place a label on the refrigerator "*prohibiting food.*"
10.	Avoid excessive use of lab bench as a storage area to prevent crowding and the potential for breakage of bottles during routine work on the bench.
11.	Keep storage of chemicals in laboratory hoods to a minimum. Chemicals may be stored within the hood on elevated shelves or platforms (noncombustible material) that do not restrict the airflow within the hood.

12.	Do not store chemicals by mere alphabetical order without regard to the class and hazard of the chemicals. Sort and store by hazard and chemical class.
13.	Use **storage trays** or secondary containers to minimize the distribution of the spill should a container break or leak. In the event of a major spill, evacuate the area and from a safe location call 911 for the BNL Emergency Services Division response team. For more guidance see the Emergency Preparedness and Spill Response Subject Areas.

Management System: Worker Safety and Health

Subject Area: Exhaust Ventilation

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Effective Date: **May 15, 2004**	Subject Matter Expert: John Peters	Management System Steward: James Tarpinian

Introduction

This subject area provides an overview of the BNL Exhaust Ventilation Program to prevent emissions of air contaminants that can be detrimental to the safety or health of any person or that can cause damage to Laboratory or private property.

Exhaust Ventilation is one of the first line of engineering control defenses against workplace hazards that are used before administrative controls and personal protective equipment. Exhaust Ventilation is designed to mitigate risk associated with the hazards of the work activity based on an assessment of the workplace. The level of protection must match the anticipated hazards and workplace factors that affect equipment performance and reliability. Each organization can choose its own method of assessment and documentation as long as they meet the requirements of this subject area.

The BNL Exhaust Ventilation Program contains the following requirements:

- Investigating alternative control measures, including other engineering and administrative controls;
- Evaluating the work conditions and selecting the exhaust ventilation to achieve maximum protection levels;
- Establishing parameters for the use and control of exhaust ventilation;

Brookhaven National Laboratory

Exhaust Ventilation Handbook

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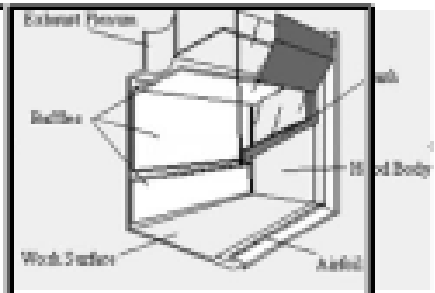
Safe Work Practices for Laboratory Hood Use by Workers

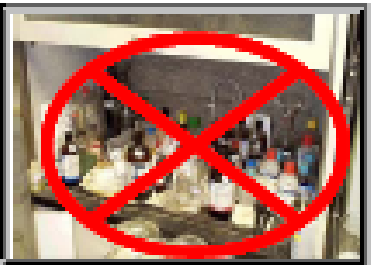
Basic features of a typical laboratory hood

- **Exhaust Plenum** - carries air from point of collection
- **Sash** - adjusts the opening to the hood face
- **Baffles** - panels that create the point of entry of air into the duct system
- **Airfoil** - a slot at the front of the hood that ensures a portion of the air enters the hood and sweeps the surface of the interior of the hood.



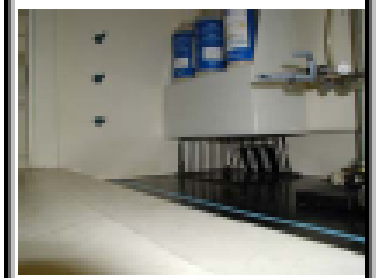
Essential Do's and Don'ts for laboratory hood work

1. Do <u>not</u> store large numbers of chemical containers or equipment in hood. The containers can block the air intake or unbalance the distribution of air. Place chemical containers into a lab hood only when they are to be used.



2. Do store very hazardous chemicals in appropriate storage units such as flammable cabinets and corrosive cabinets and store low to moderate hazard chemicals on shelves and in cabinet.

   Use a lab hood to store only very small quantities of very odorous chemicals (like mercaptans) or extremely hazardous gases (like nickel carbonyl). When storing chemicals in a hood, use a non-flammable shelf or metal rack to elevate the container off of the working surfaces so that the baffles are not blocked. Do not place containers within 6 inches of the hood face.



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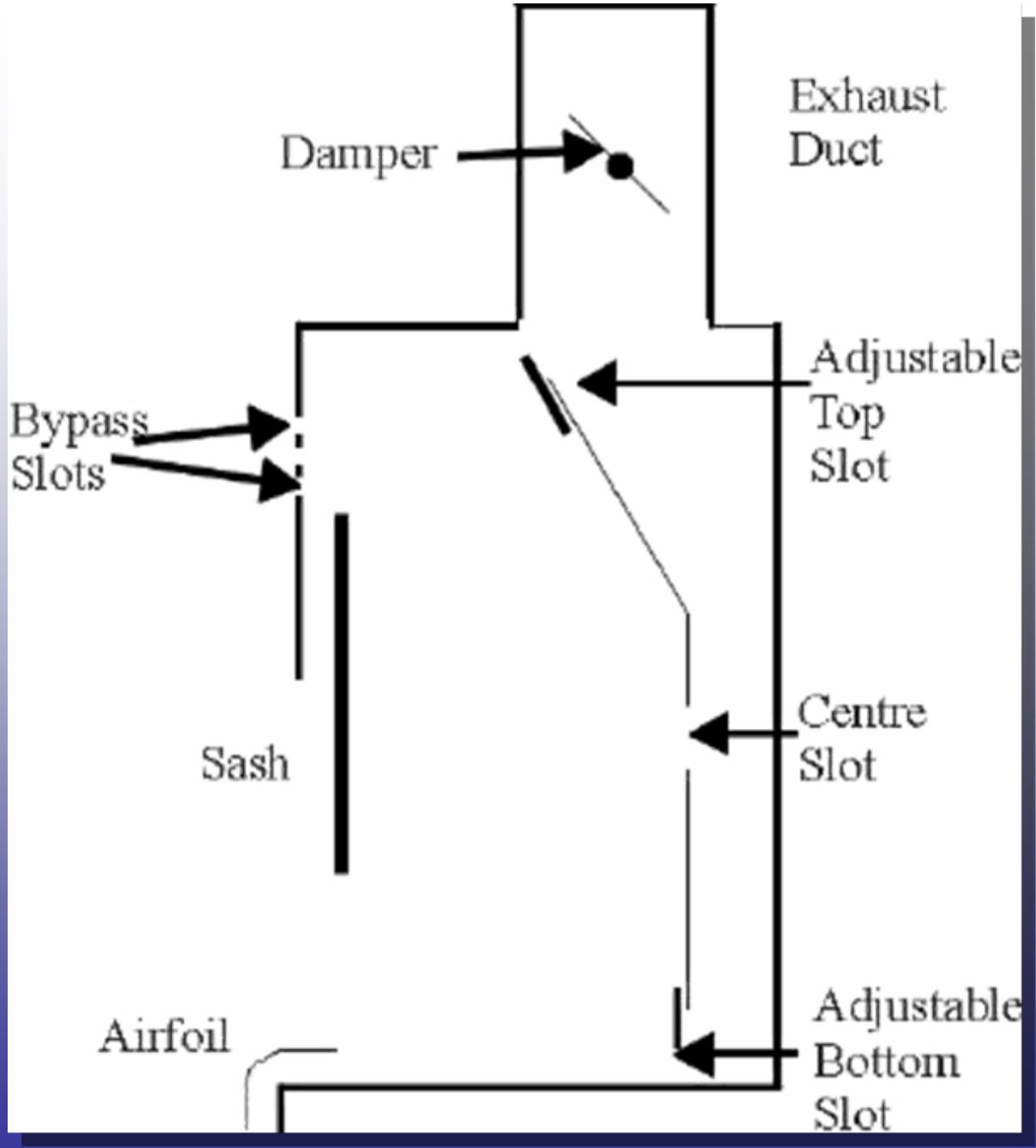
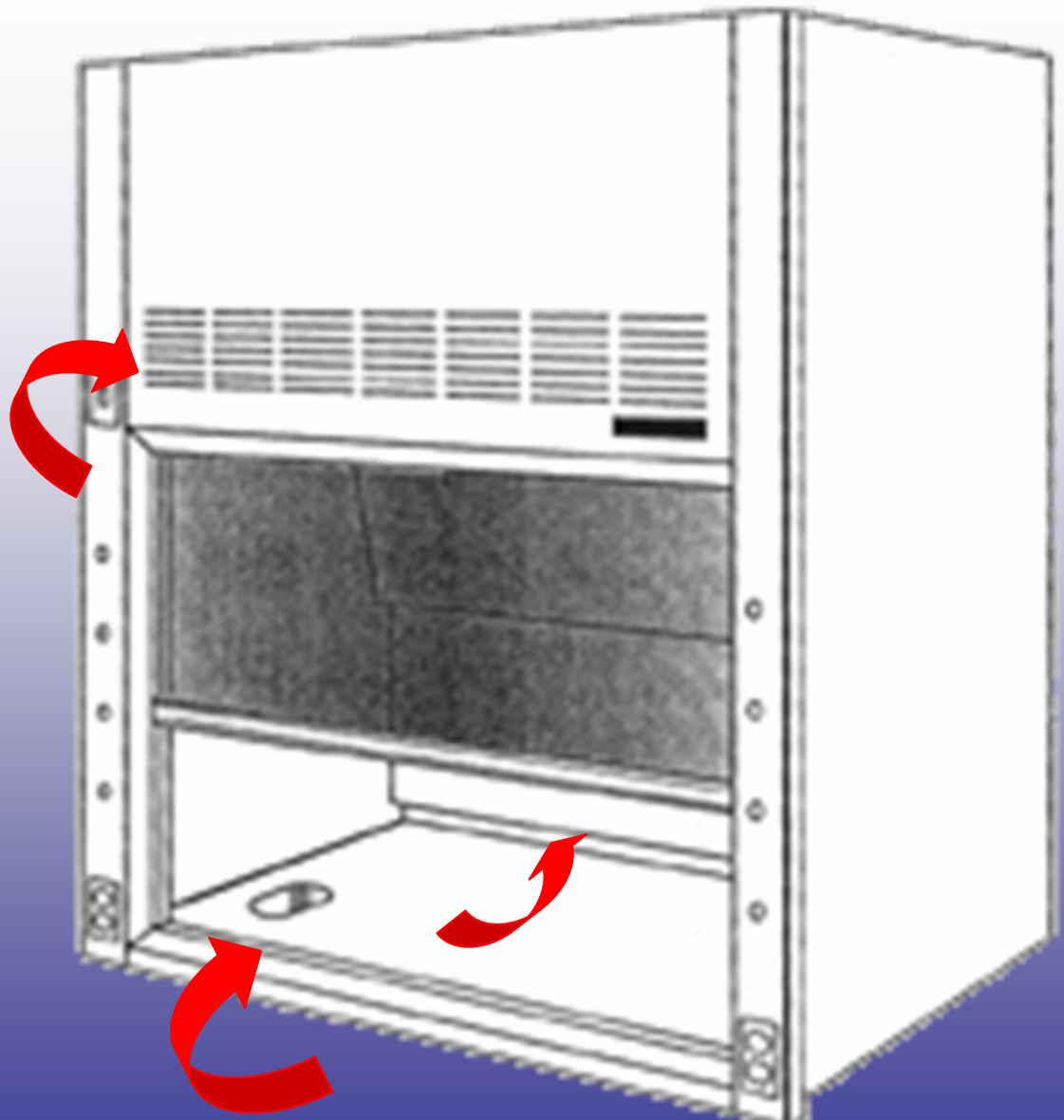
Principles and examples


Exhaust
Duct
Damper
Adjustable
Top
Slot
Bypass
Slots
Centre
Slot
Sash
Adjustable
Bottom
Slot
Airfoil




CAUTION
FLAMMABLE
KEEP FIRE AWAY

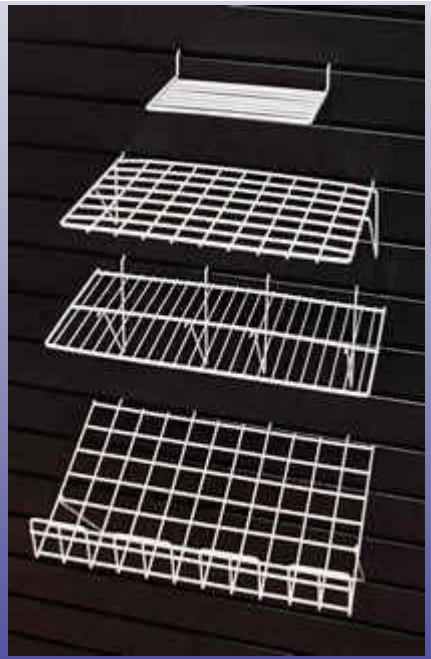

CHROMATOGRAPHY
DEVELOPING
SOLVENT
FOR USE IN HOOD ONLY
ORGANIC
LIQUID CHEMICAL WASTE
SOLID
ORGANIC
WASTE
GLASS ONLY

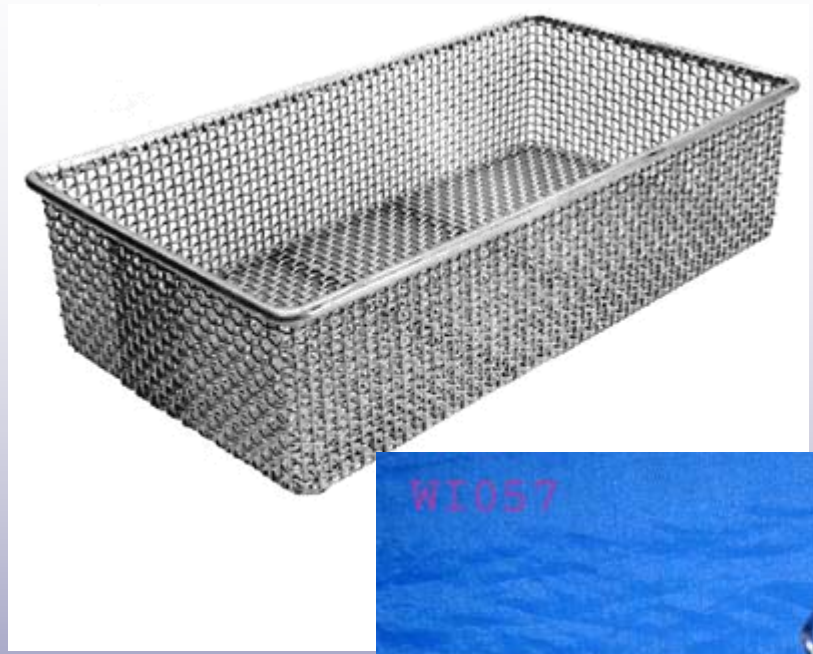

DO NOT LEAVE


WASTE
HOOD
ORGANIC
WASTE
NON-HAZARDOUS
SOLIDS
HALOGENATED
ORGANIC
WASTE


KEWAUNEE
CAUTION

Quick Solutions



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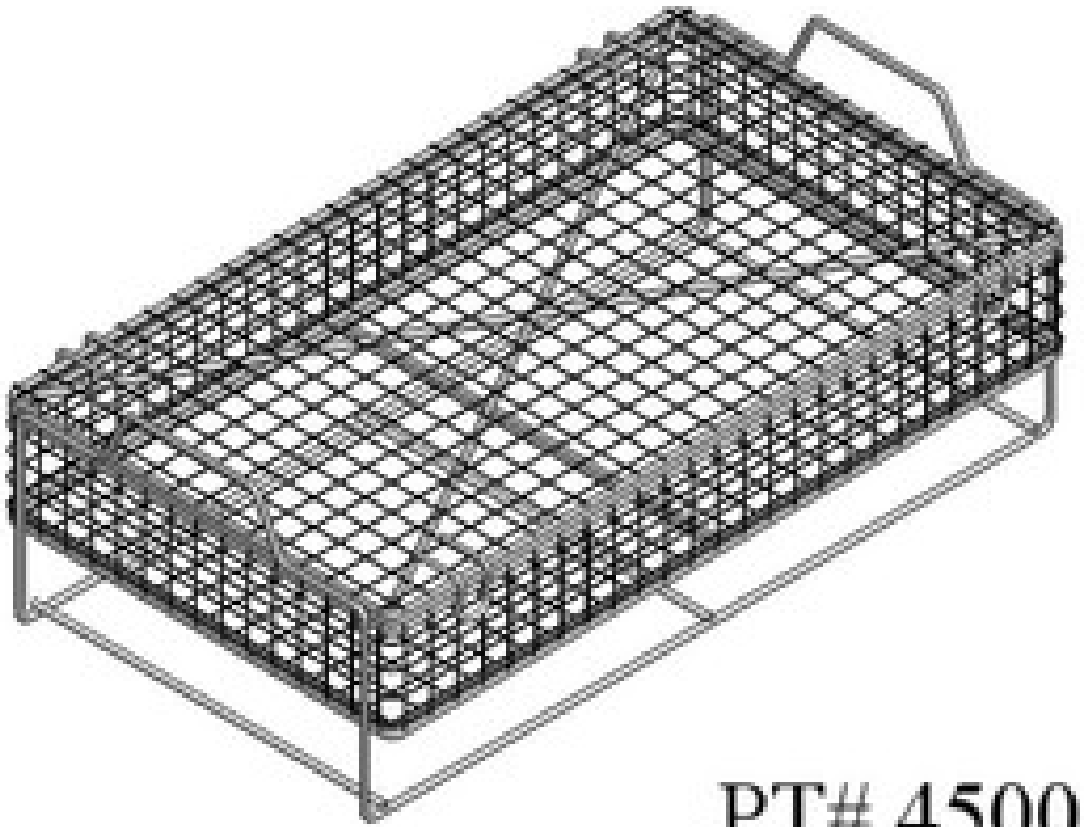

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